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## ATOMIC COLLISION AND NON-COLLISION; OR, THE CONSCIOUS AND THE UNCONSCIOUS STATES OF MATTER. A NEW THEORY OF CONSCIOUSNESS.

BY PAYTON SPENCE.

Consciousness seems to stand abruptly apart from the world of matter and its phenomena. Not only has science failed to find a connecting link which shall bind into a continuous chain the phenomena of the conscious and the unconscious universe, but it has not yet conceived of any possible means by which the chain can be made continuous even in thought or imagination. Yet the philosophy of the day poses itself on the oneness of things; and the science of the day seeks rest in a verification of the philosophical conception of the continuity of the phenomena of matter and mind. Consciousness, by its seemingly wide and abrupt separation from matter and its modes, has ever been a standing obscuration of all our prophetic glimpses of this cosmical oneness, a mockery of all human efforts to trace the chain of unbroken continuity in the phenomena of nature, and a persistent, irreducible, defiant assertion of the duality of the cosmos. Nevertheless, for reasons which will more fully appear as we proceed, we still believe in the oneness of things—we still believe that matter is the unitary constituent of the universe, and that states of consciousness and of unconsciousness are but other names for states of matter.

In the evolution of the earth, there was, of course, a time when consciousness did not exist; and, however much we may endeavor to evade the difficulty of explaining its origin by pleading the gradations from inorganic to organic nature and thence to the animal, yet the fact is undeniable, that all that part of nature which lies on one side of an indefinite period of time in the past must have been wholly unconscious, while, on this side of the line, there has been a continuous succession of consciousness; or, if we limit our vision to the present order of things, we find that everything below a certain undefined type of organic structure is

wholly unconscious, while everything above that type is conscious. Now, science does not explain how, in the order of evolution in the past, or in the order of reproduction and growth in the present, the unconscious becomes the conscious; moreover, no basic fact has been brought to light indicating an ultimate sameness between the unconscious and the conscious, and thus pointing to the possibility that the latter may be only a modification of the former.

Thus far, therefore, consciousness has no scientific genesis. By the scientific genesis of consciousness we mean its established procedure from something which existed before it, the nature of that something, and the method of that procedure. The difficulty of discovering its genesis is so great that men even of the highest scientific attainments and tendencies are tempted to fall back upon the theological explanation of the fact, and say that it has no genesis, but is a special creation. I shall not pretend to say whether science will ever admit a special creation. But I can safely say that science can never admit a special creation of anything so long as we can show that it had, or that it probably has, or that it possibly may have, a genesis.

Science gives us no reason for the existence of consciousness. Yet consciousness exists, and has its historical beginnings, and must have had its paleontological beginning. If science cannot justify the existence of consciousness, I believe it is because its essential nature has not been understood; and hence the term has been limited to that phase of it which is associated with animal life, regardless of the necessary inference that its appearance in connection with the animal organization could have been possible only because of its *præexistence* in some other, disguised form, under the name of unconsciousness, in vegetable and in inorganic matter, in the same manner that light may be said to exist in the invisible rays of the solar spectrum.

In the investigation of consciousness, we can make no assured progress until we shall have discovered a state—a state of something—in the true sense of the term. On the other hand, when we shall have discovered a state—a state of anything, whether we call it a state of matter, or of spirit, or of neither, so long as it is a state in the true sense of the term—we have found the basic fact of consciousness, the fact which makes consciousness possible, the fact which links the miscalled unconscious to the conscious,

the fact which justifies the existence of consciousness, becomes the key to its genesis and its modifications, and enables us to understand the meaning of the unconscious in the true sense of that term.

Let us, in thought, reduce matter to its simplest conceivable form—that of an atom. Now, so long as that atom of matter remains at rest, it is in what may be called a negative state. I do not mean that it is not in motion, and is, on that account, in a negative state; for, in the sense in which we use the word state, and in the sense in which we think it should always be used, neither motion nor rest, as such, is a state of matter. Motion and rest, as such, merely consist in a change and a non-change in the relative position of matter to matter, and are, therefore, phenomena of relation only, and have nothing to do with the state or states of the matter thus at rest or in motion. But, when I say that the atom of matter, when at rest, is in a negative state, I simply mean that nothing is happening to the matter itself, considered apart from all other matter and from all its relations to other matter. If, on the other hand, we suppose the same atom of matter to be in motion, it is equally in a negative state, because the motion does not affect the matter of the atom in any way, but merely changes its relation to other matter. Therefore, whether the atom is at rest or in motion, it is equally in a negative state; because nothing is happening to the matter which constitutes it.

If, now, we suppose two such atoms in the negative state (either both in motion, or one at rest and the other in motion) to meet each other, something happens to both of them at the moment of the collision. Of course, I do not mean that the motion of both is changed; but I mean that something happens to the matter itself which constitutes the atoms—something which is neither motion nor rest, but, nevertheless, something which is different from the nothing that was happening before the collision. This also is, strictly speaking, a state of matter, which, being the very opposite of what we have denominated the negative state, may be called the positive state.

If I am asked, what is the physical nature of that something which happens to matter at the moment of atomic collision, I reply, that, not having as yet determined what matter, in itself, really is, I cannot now answer; nor is it necessary that such a

question should be answered at present, the obvious and important fact being, that matter is susceptible of two states, which are just the opposite of each other—two states which are related to each other as affirmation and negation. Now, it is a law of affirmations and negations that they mutually explain and interpret each other; and that, without both, neither could be conceivable. It is thus that light interprets or explains darkness, and darkness light; and this kind of an interpretation of the one by the other is just as complete and valid to him who is totally ignorant of the physics, physiology, and psychology of light as it is to him who is familiar with those aspects of the subject. To all minds, in the last appeal to consciousness, darkness is the absence of light, and light is that which displaces darkness. We know fully as much as that, perhaps, about the two states of matter. We know that the negative state is the absence of the positive, and the positive state is that which displaces the negative; and this becomes a conscious realization, as in the case of light and darkness, when we ascertain, as I think we shall, that the positive is the conscious state of matter, while the negative is the unconscious state of matter. When this shall be ascertained, it will be evident that, in the act of atomic collision, matter runs into consciousness, loses its material aspect, and can no longer be described in the terms of matter. Thus, at this early stage of our discussion, our final conclusion is foreshadowed, namely, that matter and consciousness are in their ultimates the same.

The negative state of matter, being the absence of—the negation of—the positive state, is, of course, not susceptible of degrees. On the other hand, the positive state, being induced by the collision of matter with matter, must be variable, the degrees of variation being dependent upon the rapidity and the relative direction of the motion of the colliding atoms. Having once admitted that the positive state is induced by the collision of moving matter, we are compelled to go a step farther, and admit that the varying degrees of the velocity, and the varying relative direction of the motion of the moving matter, at the moment of collision, must induce varying degrees of the positive state, running downwards approximately to the negative state, and upwards indefinitely from the negative.

In the positive and the negative states of matter we have the

conscious and the unconscious universe—the negative being the unconscious and the positive the conscious. I, of course, use the term conscious in a wider sense than that which is usually given it, as I embrace under that term all the degrees of the positive state of matter, including, not only human and animal consciousness, as is generally done, but also including all degrees of the positive below that of human and animal consciousness, as well as all degrees above it. The positive or conscious states of matter may, therefore, be divided into three classes (each class containing, of course, many degrees): namely, the sub-conscious, the conscious, and the supra-conscious. The conscious embraces all degrees of human and animal consciousness; the sub-conscious embraces all degrees below human and animal consciousness; and the supra-conscious embraces all degrees above human and animal consciousness. The states of matter, therefore, form an unbroken series, consisting of the unconscious, the sub-conscious, the conscious, and the supra-conscious, which are shaded off into each other through countless degrees.

The following considerations give us confidence in the foregoing theory of consciousness.

1st. Having found that matter is susceptible of a state, in the true sense of the term, I decline to search any farther for consciousness, but take it for granted that that state is the conscious state. Were I now to search for consciousness in some substance other than matter, I could only hope to find what I have already found; that is, something which is susceptible of a state; and that state I would have to call the conscious state, just as I have already done in regard to the state of matter. If I am not satisfied to call the state of matter a state of consciousness, I could be no better satisfied in calling the state of the other substance a state of consciousness. And so I must continue my search indefinitely, always finding states, and always unwilling to recognize the true value of my findings. Therefore, I can only bring this chase after the ultimate conscious substance to an end, by at last imagining that I have finally reached a substance which does not need another substance to be conscious of its states, because, in that ultimate, hypothetical substance, state and consciousness are synonymous—are one and the same thing, and hence need no mediator. I would thus travel in a circle, and end where I began.

Therefore, as this oneness of state with consciousness is the ultimate fact which all theories must reach, and which no theory can evade, and as I have found a state in matter, there also I must recognize consciousness to be.

2d. Spencer has endeavored to show "that something of the same order as that which we call a nervous shock is the ultimate unit of consciousness. . . . A unit of consciousness being the correlative of a *rhythical motion* of a material unit or of groups of such units." The italics are mine. Now, the "nervous shock" of Spencer, as "the correlative of a *rhythical motion* of a material unit or of groups of such units," is utterly barren and unfruitful until we engraft upon it the positive state of the material unit or groups of units as developed by atomic collision. We have seen that mere motion cannot raise matter out of the negative state which it is in when at rest; and what is said of matter in this respect must be equally true of spirit or substance of the mind, supposing for the moment that there is such a thing. Matter merely in motion, like matter at rest, amounts to nothing; it is suffering nothing and doing nothing. But we cannot possibly conceive of matter except as being either at rest or in motion, or as being in collision; and if matter, whether at rest or in motion, is in a negative state, existing as though it did not exist, the real phenomenon—the real outcome of the universe of matter and motion—the thing accomplished, and the only thing accomplished, is collision—the awakening of matter into its positive state. If this is true of inorganic matter, it must be equally true of organic matter. In the nervous system of man and of animals, there must be either atomic rest, which amounts to nothing, or atomic motion, which also amounts to nothing; or there must be atomic collision, which does accomplish something—does induce a state of matter which is the essence of Spencer's "nervous shock," and without which that nervous shock, like mere motion and rest, would amount to nothing. Therefore, the unit of consciousness (human and animal) is that positive state of nervous atoms which is induced by their collision, not by their mere motion. But it is evident that this unit of human and animal consciousness can differ in quality and degree only, not in kind, from the positive state of the atoms of inorganic bodies. If the positive state, in any of its degrees, is consciousness, it is consciousness in all of

them, extending down through the sub-conscious, and up through the supra-conscious.

3d: Consciousness, as an unquestionable fact, is legitimately within the domain of science; but, the only thing that science can do with it is, to ascertain its relations. What is it related to? The prevailing theory is that consciousness and motion are so intimately related that no other fact or phenomenon can stand between them; that, whether consciousness be regarded as a state of spirit or as a state of matter, its immediate forerunner—its causal antecedent—is a mode of motion in either a material or a spiritual substance. We have already seen, however, that mere motion does not, and cannot, induce a state or constitute a state of matter at all different from the state which it is in when at rest. Whatever the immediate causal antecedent of consciousness may be, therefore, we can say, with confidence, that it is not, and cannot be, motion, spiritual or material. Between consciousness and motion there always stands, and always must stand, that other phenomenon, *atomic* collision. *Atomic* collision, therefore, is the invariable antecedent and the inevitable antecedent of consciousness, and intervenes between motion and consciousness. Hence, if the question be, whether motion or collision is the causal antecedent of consciousness, we are compelled to say that it is collision. Moreover, as we know of no phenomenon which stands between collision and consciousness, and as we cannot conceive of either the possibility or the necessity of any intermediate phenomenon between them, we are equally compelled to say that atomic collision and consciousness are related as cause and effect.

4th. The following double dilemma has constantly presented itself to the psychologist. While, on the one hand, it has seemed evident that matter cannot act upon mind, nor mind upon matter, on the other hand, it has seemed equally evident that matter must act upon mind, and mind upon matter. In other words, mind and matter are said to be so different from each other that they cannot act upon each other; yet mind seems to be constantly moving matter, and matter constantly moving mind. The theory of mind or of consciousness here presented encounters no such dilemma. This will be better understood by the reader after he shall have perused the sixth argument of this discussion, from which it will be seen that consciousness does necessarily move

matter, and is the only thing that can move matter. With regard to the other part of the double dilemma, it is evident, from what has already been said, that mind or consciousness is a state of matter which is induced by matter.

5th. The mind is a compound of related elements. But how can states of consciousness be related, and in what does that relation consist? Aside from the theory of consciousness here presented, there is but one other which we are called upon to consider, namely: that consciousness is a mode of motion in either matter or spirit? According to this theory, if a sensation is a mode of motion, a perception must be two or more related modes of motion. But how can modes of motion be related? A mere relation of proximity cannot cause modes of motion to affect each other. This is true physically as well as mentally. Proximate atoms or bodies in motion do not modify each other's motion simply by being proximate; and we may hear a sound and see a light, both at the same time, yet the two sensations do not modify each other unless they are related through something more than proximity and simultaneousness. There is but one other way in which modes of motion can be related, namely: by an arrest, increase, or retardation of each other. An arrest of each other would cause unconsciousness, if we suppose consciousness to be a mode of motion. An increase or a retardation of each other would still leave them simple and independent of each other, and not blended into compound motions as sensations are blended into perceptions; and, hence, that increase or retardation of the motions would, in the case of sensations or of any other states of consciousness, merely increase or diminish their intensity, still leaving them separate and unchanged in quality. Probe this question as we may, we finally come to a point where, in order to conceive of states of consciousness as related to each other, and therefore as modifying each other, we must conceive of them as interpenetrating each other in time and space, that is, as located in the same ultimate part of whatever is regarded as the substance of the mind, and as existing simultaneously in that part. Such a conception, however, is incompatible with a conception of a state of consciousness as a mode of motion. The motion of an atom, or of a molecule, or of a mass of matter, however often it may be changed in direction or in velocity, always remains simple—never becomes compound.

In the light of the theory here presented, the above difficulties disappear; and the relation between two or more states of consciousness, in such a manner as to modify each other, not merely in degree but in quality, becomes not only a phenomenon which can be conceived of and understood, but one which, it is perceived, must also be inevitable. For example, if the atoms *A* and *B* collide at the same moment with the atom *C*, the state into which *C* is thrown by the double collision cannot be the same as that which would be induced by a collision with either *A* or *B* alone, but is necessarily a modification of both such states, and partakes of the nature of both. The simultaneous interpenetration of states is complete. If two nervous molecules, each composed of many atoms, collide, there would be, simultaneously with the molecular collision, a collision of the atoms of each molecule among themselves, so that each atom would simultaneously collide with several others at varying angles and with varying degrees of intensity; and hence each atom would be thrown into a compound state, the resultant of the modifications of the several atomic collisions upon each other. A single collision of two such nervous molecules in the sensorium would induce that positive state which may be regarded as the unit of consciousness\* (human and animal), corresponding to Spencer's "nervous shock." If, however, the two molecules, as the result of that vibratory motion into which they are thrown by a corresponding vibratory motion reaching them from an organ of sensation, collide again and again with great rapidity, the superimposed and interpenetrating states thus awakened so modify each other that the unit of consciousness—the "nervous shock"—is converted into a compound state of consciousness—a sensation; a simple noise, for instance, is converted into a tone. In the same way, the more complex composition of the higher mental phenomena may be explained by the mutual modifications of superimposed and interpenetrating but less complex states of consciousness.

6th. It is a question which has agitated the ages, whether there

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\* With the understanding, however, that this *unit of consciousness* is not simple but compound, and yields, to an ultimate analysis, its affirmative and its negative elements, as I have endeavored to show in an article entitled, "Time and Space considered as Negations," published in this Journal, October, 1879.

is outside of the mind anything that resembles those states of consciousness called sensations and perceptions. I believe that the highest expression of thought of the present day upon that question is, that our states of consciousness are only symbols of the realities, not necessarily bearing any more resemblance to the realities than the algebraic  $x$  does to the unknown quantity which it represents. I do not propose here to take up the consideration of that difficult subject, the perception of external objects; but I wish merely to show the reader how it is possible for the theory of consciousness here presented to shake his conviction, as it certainly has shaken mine very recently, in the truth of the prevalent doctrine that our states of consciousness are merely symbols of realities; and how it may possibly prove to be the long-sought reconciliation between the subjective and the objective.

If a ray from the sun creates in me a sensation of light, the fact may be expressed as well, perhaps better, by saying that it produces in me a state of conscious illumination. But as the consciousness and the illumination are one and the same thing, the expression of the fact may be simplified by saying that the ray from the sun produces in me a state of illumination; and if that simple sensation be abstracted from all other actual and possible, associated states of consciousness, so that it remains as the sum total of the individual mind, then we may correctly say that that individual mind, thus reduced to its simplest form, is an illumination. At one end of the ray from the sun, the inner cerebral end, we therefore find matter in a positive state, matter in a state of consciousness, matter in that state of consciousness called illumination, matter in a state of illumination. Now, if, from that inner cerebral end of the ray, where we find matter in a state of illumination, we follow that ray towards the sun, we find all along its line, from the brain through the nerves, the special senses, and the ether to the sun itself, a continuous chain of undulations with their inevitable atomic collisions, which are of the same character, though not necessarily of the same degree or quality as those in the brain itself—in other words, a chain of atoms in positive states—states of consciousness which we have no reason for believing are different in kind from those of the brain-atoms, and which therefore are states of conscious illumination. Illumination, therefore, as a conscious state, is an all-pervading state of matter, not

peculiar to the animal organization, but existing in the animal organization simply because that organization is matter, and, as such, is susceptible of the states of matter.

Of course, if we admit the correctness of the above illustration, we must accept its legitimate consequences, and say, that all sensations are localized, modified manifestations of all-pervading states of matter. This general conclusion pushes us to another, still more general and comprehensive. Force, like light, heat, sound, etc., is a sensation—a state of consciousness, under any theory of consciousness; and under the theory here presented, if it is a state of consciousness, it is not limited to the nervous tissue, but is a state present in colliding matter wherever it exists. This conclusion drives us one step farther, and brings us face to face with the following ultimate fact. All sensations, in their final analysis, are phenomena of resistance, involving force, therefore, as their mental constituent; hence, that state of consciousness which we call force is identical with sensation in all its forms, and through sensation it is identified with the positive state of matter in all its various degrees and their modifications whether of the sub-conscious, the conscious, or the supra-conscious. Consciousness and force, then, are identical, all-pervading states of matter.

The identity of the positive or conscious state of matter with force may be reached by a somewhat different method. It is evident that no theory of aggregates or clusters of atoms, whether forming vibrating molecules or revolving vortices, can enable us to evade the consideration of what must necessarily happen to the ultimate atom. The law of the atom must govern its compounds; and the fate of the atom must decide the fate of the molecule and of the vortex. Let us, then, suppose that two atoms move towards each other, on the same line, with equal velocities, and collide. Being unparticled and indivisible, as atoms must be supposed to be, they are necessarily non-elastic, for the reason that elasticity is merely the phenomenon of atoms, molecules, or particles, recovering the relative positions out of which they had been forced; and in a simple atom there being no related elements, there are no relative positions to be lost or recovered. The two colliding atoms, then, being non-elastic, would simply neutralize each other's motion; and instead of the law of the continuity of motion we should have the law of motion annihilating its equivalent of mo-

tion. Therefore the ultimate and speedy result of that molecular vibration, which is the life of the universe, would be the collision of the atoms which make up masses, organic and inorganic, solid, liquid, and gaseous, suns, planets, and satellites, and hence the annihilation of all their atomic motion—all their life. Therefore the law of the continuity of motion constrains us to suppose that the positive state of matter which atomic collision induces is a state of force which compels the colliding atoms to rebound from each other with a velocity equal to that which they had before the collision.

7th. Within the last few years, the phenomena of unconscious cerebration have risen from comparative obscurity and neglect, and have taken a position in the front rank as subjects of the greatest interest and importance, demanding an explanation, and threatening some of the cherished convictions of modern psychologists. The very term, unconscious cerebration, carries with it, of course, a theory of the nature of the phenomenon itself—a theory which was the outgrowth of the current idea, that there can be no mind without consciousness (human or animal consciousness). To have called the phenomenon unconscious thought would have seemed absurd, as absurd as to have called it unconscious consciousness. To save the current idea, therefore, it was called cerebration—physical action, not mental action—a brain activity without thought, but, nevertheless, an activity which may be subsequently reproduced in connection with consciousness or thought; or, without being reproduced, may modify subsequent kindred mental action or thought in the same mind.

The few isolated facts which are ordinarily relied upon to prove that there is such a thing as unconscious cerebration are but as a drop to a boundless ocean of similar facts. When this subject shall have been properly unfolded, it will be seen that the phenomena of consciousness (human and animal), even within the limited sphere of the nervous system, are related as an infinitesimally small part to a vast aggregate of unconscious cerebrations (sub-conscious, and perhaps supra-conscious states) which form the bulk and body of all mental phenomena. But the important point in this connection is the fact, so clearly demonstrated by the acknowledged phenomena of unconscious cerebration, *that the unconscious (the sub-conscious, and perhaps the supra-conscious) modifies the conscious (human and animal), and that the two become*

*blended into compound states, thus proclaiming their sameness or kinship,* and showing that mind runs down deeper into matter than is generally supposed.

In conclusion, we have shown that the positive states of matter induced by atomic collision are states of consciousness. We have also identified force with consciousness. Therefore, matter and consciousness are the all of things. Have we still on our hands, then, an irreconcilable duality—the duality of matter and consciousness—or is it possible for us to reduce one of them to the other; and, if so, which one shall we retain as the universal, cosmical constituent?

If there is anything which we positively know, or which we know positively *is*, it is our states of consciousness. Consciousness, then, as an ultimate fact cannot be surrendered. Therefore, the only remaining question is: Must we, or can we, surrender matter as a separate ultimate? I shall not, in this connection, amplify the answer to this question, but shall simply present it in the following condensed form:

What is matter? As we have already shown, matter is that something whose modifications are states of consciousness. But if the ultimates of matter are not already ultimates of consciousness, no modification of the former ultimates can convert them into the latter; or, in other words, ultimates are non-convertible into each other. Moreover, in the act of atomic collision, matter and consciousness, the thing modified and its modification, are causally and efficiently related. But there can be no causal or efficient relation between things unless they are in their ultimates the same. Hence matter and consciousness, in their ultimates, are the same; and the modification and the thing modified are, in the last analysis, reduced to states of consciousness, or, what amounts to the same thing, consciousness; and, therefore, consciousness is the ultimate, unitary cosmical constituent. In the collision of forces or states of consciousness, one becomes matter to the other. To every individual, matter is all those forces or states of consciousness which impinge upon his consciousness in such a way as to make him realize them as something separate and apart from himself. If, in this article, I have seemingly used the word matter in a different acceptation, it was provisionally only, until this, my final conclusion, could be reached.